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FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER	
THOMPSON, JAMES A	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/902,760	MATSUOKA, HIROCHIKA	
	Examiner	Art Unit	
	James A. Thompson	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 13 June 2007 have been fully considered but they are not persuasive. Examiner has fully considered newly added claim 20 with respect to the cited reference Ng (USPN 5,185,661), and considers Ng to anticipate claim 20, as set forth in detail in the prior art rejections below. How Ng is interpreted to disclose each and every element of claim 20 is explained below in the corresponding prior art rejection.

With respect to the Applicant's arguments regarding claim 12, Examiner would note that the input gamut data points ($P_i(L_i^*,a_i^*,b_i^*)$) include not only internal data points, but also surface data points. While figure 8 of Ng does indeed show only the output color gamut, the boundary of the input color gamut is mapped to the boundary of the output color gamut. For example, in the case of an input color gamut containing a larger color space, boundary points would be mapped to the boundary of the output color space *via* compression of the color space. Further, as Applicant has pointed out in Applicant's arguments, claim 12 does not set a particular predetermined number of points, as claim 20 does, but rather simply recites that the first sample points on a surface of the first color gamut are set.

The present amendments to claim 12 have been fully considered and are deemed to be anticipated by Ng. Some portions of the rejection of claim 12 has been expanded somewhat for greater clarity, and the amendments to claim 12 have been incorporated into the rejection after a further consideration of Ng.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 12 and 16-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Ng (US Patent 5,185,661).

Regarding claims 12, 16 and 17: Ng discloses an image processing apparatus (figures 9A-9B of Ng) which maps a first color gamut into a second color gamut (figure 6 and column 6, lines 17-20 of Ng), comprising: a first sample point setting unit (figure 9A(18) and column 4, lines 37-42 of Ng) adapted to set first sample points on a surface of the first color gamut (figure 6; figure 8; and column 8, lines 4-24 of

Ng – $P_i(L_i^*,a_i^*,b_i^*)$ *points which occur on the surface of the input color gamut i*) and second sample points in the first color gamut (figure 6 and column 6, lines 9-13 of Ng – $P_i(L_i^*,a_i^*,b_i^*)$ *points which occur internally in the input color gamut i*); an obtaining unit (figure 9A(20) and column 4, lines 69 to column 5, line 3 of Ng) adapted to obtain third sample points by mapping the first sample points into the second color gamut, and obtaining fourth sample points by mapping the second sample points into the second color gamut (figure 6 and column 6, lines 9-21 of Ng – $P_o(L_i^*,a_i^*,b_i^*)$ *points are mapped from both the surface input points and the internal input points; the boundary surface points of the input color space would be mapped to boundary surface points of the output color space, whether through direct mapping, expansion [in the case that output color space is larger than input color space], or compression [in the case that output color space is smaller than input color space]*); a gradation line setting unit (figure 9A(22(portion)) and column 5, lines 19-24 of Ng – *gradation line setting is portion of operations performed by tri-linear interpolation unit (22)*) adapted to set surface gradation lines based on the first sample points (figure 8(21) and column 8, lines 17-37 of Ng) and internal gradation lines based on the second sample points (figures 7b-7c; column 7, lines 25-43; and column 8, lines 37-42 of Ng); a gradation line mapping unit (figure 9B(32) and column 6, lines 42-48 of Ng) adapted to map the surface gradation lines based on the third sample points (figure 8(21) and column 8, lines 17-37 of Ng), and mapping the internal gradation lines based on the fourth sample points (figures 7b-7c; column 7, lines 25-43; and column 8, lines 37-42 of Ng); a calculating unit (figure 9A(22(portion)) and column 5, lines 19-24 of Ng – *calculating unit is portion of operations performed by tri-linear interpolation unit (22)*), for calculating a relative position of an input color to the surface gradation lines or the internal gradation lines (column 4, lines 50-64 and column 5, lines 10-24 of Ng – *position in color space used to determine (1) closest index point in lookup table and (2) relative position to closest index point, in order to determine output value [even if relative position is zero, and thus the lookup data point is used without interpolation]*); and a calculating unit (figure 9A(22(portion)) and column 5, lines 19-24 of Ng – *calculating unit is portion of operations performed by tri-linear interpolation unit (22)*), for calculating an output color from the mapped surface gradation lines or the mapped internal gradation lines, based on the relative position (column 4, lines 50-64 and column 5, lines 10-24 of Ng – *again, position in color space used to determine (1) closest index point in lookup table and (2) relative position to closest index point, in order to determine output value [even if relative position is zero, and thus the lookup data point is used without interpolation]*), wherein the surface gradation lines and the internal gradation lines each indicate a locus of color change in the first color gamut, and the mapped surface gradation lines and the mapped internal gradation lines each indicate a locus of color change in the second color gamut (figure 6 and column 8,

lines 37-42 of Ng – *Both the internal and boundary points are mapped with respect to a locus of color change (ΔH) and stored in a LUT*).

Regarding claim 18: Ng discloses that the relative position is defined by a ratio of internal division (figure 7b and column 7, lines 24-30 of Ng).

Regarding claim 19: Ng discloses that the relative position is defined by an angle ratio (figure 7c; figure 8; and column 8, lines 4-16 of Ng).

Regarding claim 20: Ng discloses setting a set consisting of a first predetermined number of first sample points on the surface of the first color gamut (figure 6; figure 8; and column 8, lines 4-24 of Ng – *$P_i(L_i^*,a_i^*,b_i^*)$ points which occur on the surface of the input color gamut i – also see column 4, line 64 to column 5, line 9 of Ng, which demonstrates that the number of sample points for the gamut is predetermined based on the characteristics of the color space; thus the number of surface sample points is predetermined*), and a set consisting of a second predetermined number of second sample points in the interior of the first color gamut (figure 6 and column 6, lines 9-13 of Ng – *$P_i(L_i^*,a_i^*,b_i^*)$ points which occur internally in the input color gamut i – also see column 4, line 64 to column 5, line 9 of Ng, which demonstrates that the number of sample points for the gamut is predetermined based on the characteristics of the color space*), where the second predetermined number may be either equal to or different from the first predetermined number (*equal to or different from would cover all possible combinations of first predetermined number of first sample points and second predetermined number of second sample points*); obtaining third sample points corresponding to respective ones of the first sample points (figure 6 and column 6, lines 9-21 of Ng – *$P_o(L_i^*,a_i^*,b_i^*)$ points are mapped from both the surface input points and the internal input points; the boundary surface points of the input color space would be mapped to boundary surface points of the output color space, whether through direct mapping, expansion [in the case that output color space is larger than input color space], or compression [in the case that output color space is smaller than input color space]*), and fourth sample points corresponding to respective ones of the second sample points (figure 6 and column 6, lines 9-21 of Ng – *$P_o(L_i^*,a_i^*,b_i^*)$ points are mapped from both the surface input points and the internal input points; the boundary surface points of the input color space would be mapped to boundary surface points of the output color space, whether through direct mapping, expansion [in the case that output color space is larger than input color space], or compression [in the case that output color space is smaller than input color space]*), wherein the third sample points and the fourth sample points are in the second color gamut (*third and fourth sample points are within $P_o(L_i^*,a_i^*,b_i^*)$, the second (output) color gamut*), and the fourth sample points are in the interior of the second color gamut (*fourth sample points derived from second sample points, and*

are thus interior of the second color gamut); setting first surface gradation lines based on the first sample points and first internal gradation lines based on the second sample points, the first surface gradation lines each lying entirely on the surface of the first color gamut (figure 8(21) and column 8, lines 17-37 of Ng – *boundary surface points of the input color space would be mapped to boundary surface points of the output color space, whether through direct mapping, expansion [in the case that output color space is larger than input color space], or compression [in the case that output color space is smaller than input color space]*) and the first internal gradation lines each containing points in the interior of the first color gamut (figures 7b-7c; column 7, lines 25-43; and column 8, lines 37-42 of Ng), wherein the first surface gradation lines and the first internal gradation lines each indicate a respective locus of color change in the first color gamut (figure 6 and column 8, lines 37-42 of Ng – *both the internal and boundary points of the first color gamut are mapped to the second color gamut with respect to a locus of color change (ΔH), and the results stored in a LUT; thus, the first surface and internal gradation lines each indicate a respective locus of color change in the first color gamut*); mapping the first surface gradation lines to second surface gradation lines that are based on the third sample points (figure 8(21) and column 8, lines 17-37 of Ng), and mapping the first internal gradation lines to second internal gradation lines that are based on the fourth sample points and that lie in the interior of the second color gamut (figures 7b-7c; column 7, lines 25-43; and column 8, lines 37-42 of Ng), wherein the second surface gradation lines and the second internal gradation lines each indicate a respective locus of color change in the second color gamut (figure 6 and column 8, lines 37-42 of Ng – *both the internal and boundary points are mapped with respect to a locus of color change (ΔH) and stored in a LUT*); and mapping an input color into an output color in the second color gamut by using the second surface gradation lines and the second internal gradation lines (figure 6 and column 8, lines 37-42 of Ng – *both the internal and boundary points are mapped with respect to a locus of color change (ΔH) and stored in a LUT*), wherein said step of mapping the input color into the output color in the second gamut includes calculating the output color from the second surface gradation lines and the second internal gradation lines, based on the input color and its location in the first color gamut relative to at least one gradation line from among the first surface gradation lines and the first internal gradation lines (column 4, lines 50-64 and column 5, lines 10-24 of Ng – *position in color space used to determine (1) closest index point in lookup table and (2) relative position to closest index point, in order to determine output value [even if relative position is zero, and thus the lookup data point is used without interpolation]*).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ng (US Patent 5,185,661) in view of Tuijn (US Patent 6,058,207).

Regarding claim 13: Ng does not disclose expressly that the surface, internal, mapped surface, and mapped internal gradation lines are obtained by using at least one of a B-spline curve, a rational B-spline curve, a Bezier curve, and a one- or more-dimensional spline curve.

Tuijn discloses performing color modification in a color gamut (column 6, lines 58-67 of Tuijn) by obtaining a curve using at least one of a B-spline curve, a rational B-spline curve, a Bezier curve, and a one- or more-dimensional spline curve (column 12, lines 42-49 and column 13, lines 7-10 of Tuijn).

Ng and Tuijn are combinable because they are from the same field of endeavor, namely color gamut correction and modification for digital color processing systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a spline function or a Bezier function, as taught by Tuijn, to obtain the surface, internal, mapped surface, and mapped internal gradation lines taught by Ng. The motivation for doing so would have been that appropriate weight values are required to better transform color space values (column 5, lines 32-38 of Tuijn), such as in the case of the spline (column 12, line 47-52 of Tuijn) and Bezier curves (column 13, lines 7-10 of Tuijn). Therefore, it would have been obvious to combine Tuijn with Ng to obtain the invention as specified in claim 13.

6. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ng (US Patent 5,185,661) in view of Berns (*Principles of Color Technology*, by Roy S. Berns, third edition, pp. 20-23 and pp. 151-164).

Regarding claim 14: Ng discloses that the first sample points are located in L*a*b* space (figure 6 and column 4, lines 37-42 of Ng).

Ng does not disclose expressly that the first sample points are located on six faces of an R (red) face, a G (green) face, a B (blue) face, a C (cyan) face, a M (magenta) face, and a Y (yellow) face in the first color gamut.

Berns discloses sampling color points which are located on six faces of an R (red) face, a G (green) face, a B (blue) face, a C (cyan) face, a M (magenta) face, and a Y (yellow) face in a color gamut (page 153 figure; page 154 figure; and page 155, left column, last paragraph of Berns).

Ng and Berns are combinable because they are from the same field of endeavor, namely color image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the RGB additive - CMY subtractive color space taught by Berns instead of the L*a*b* color space taught by Ng. The motivation for doing so would have been that RGB primary colors are the primary colors directly used for CRT displays, and CMY primary colors are the primary colors directly used for paints and printer inks (page 155, left column, last paragraph of Berns). Therefore, it would have been obvious to combine Berns with Ng to obtain the invention as specified in claim 14.

Regarding claim 15: Ng discloses that the mapping of the surface and internal gradation lines to the second color gamut includes mapping in an L*a*b* color space according to the first color gamut and the second color gamut (figure 6 and column 4, lines 37-42 of Ng).

Ng does not disclose expressly that said mapping of the surface and internal gradation lines to the second color gamut includes two-dimensional mapping on a lightness-chroma plane, and adjustment of the hue component.

Berns discloses mapping sample points to a second color gamut including two-dimensional mapping on a lightness-chroma plane (page 21, right column, last full paragraph and last two lines to page 22, left column, first two non-figure text lines; and page 21, right column, figure("Achromatic pebbles") and figure("Chromatic pebbles") of Berns), and adjustment of the hue component (page 22, left column, both figures; and page 22, right column, first paragraph under "Color Coordinates" heading).

Ng and Berns are combinable because they are from the same field of endeavor, namely color image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to map the surface and internal gradation lines taught by Ng onto a second color gamut, wherein said second color is a lightness-chroma-hue color gamut, and adjusting the hue, as taught by Berns. The suggestion for doing so would have been that colors can be conveniently quantified according to their lightness, chroma and hue (page 22, "Hue", "Lightness" and "Chroma" bullet points of Berns). Therefore, it would have been obvious to combine Berns with Ng to obtain the invention as specified in claim 15.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
   a. Lin et al., US Patent 6,204,939 B1, Patented 20 March 2001, Filed 30 March 1998.
   b. Takahashi et al., US Patent 6,882,445 B1, Patented 19 April 2005, Filed 07 January 2000.
   c. Ito et al., US Patent 6,388,674 B1, Patented 14 May 2002, Filed 21 May 1999.
   d. Guay, US Patent 5,903,275, Patented 11 May 1999, Filed 07 March 1999, first application in chain of continuations filed 16 February 1994.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

James A. Thompson
Examiner
Technology Division 2625

/JAT/
16 September 2007

DAVID MOORE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600